

CLAIMS

THE FOLLOWING IS CLAIMED:

- 1 1. An apparatus for low-damage anisotropic dry etching of a substrate, comprising:
2 a plasma reactor for containing a plasma; and
3 a mechanical support within said plasma reactor, said mechanical support
4 isolated from the creation of the plasma; and
5 an additional structure capable of being electrically biased, the additional
6 structure disposed within the plasma reactor proximal to the mechanical support, wherein
7 when the plasma reactor contains a plasma, at least a portion of the additional structure extends
8 into the plasma.
- 1 2. The apparatus of claim 1, wherein said additional structure is dc electrically biased
- 1 3. The apparatus of claim 1, wherein said additional structure is ac electrically biased.
- 1 4. The apparatus of claim 1, wherein said additional structure is both ac and dc electrically
2 biased.
- 1 5. The apparatus of claim 1, wherein said mechanical support is electrically isolated from
2 the plasma creator.
- 1 6. The apparatus of claim 5, wherein said additional structure is electrically isolated from
2 both the mechanical support and from the plasma creator.
- 1 7. The apparatus of claim 6, wherein said additional structure is dc electrically biased
- 1 8. The apparatus of claim 6, wherein said additional structure is ac electrically biased.

1 9. The apparatus of claim 6, wherein said additional structure is both ac and dc electrically
2 biased.

1 10. The apparatus of claim 1, further including:
2 an electrically insulating member disposed on the mechanical support, the electrically
3 insulating member circumscribing a portion of the mechanical support.

1 11. The apparatus of claim 10, wherein the electrically insulating member is in
2 communication with the additional structure.

1 12. An apparatus for low-damage anisotropic dry etching of a substrate, comprising:
2 a direct current plasma reactor including a cathode and an anode;
3 means for generating low energy electrons with a cold cathode;
4 means for subjecting a semiconductor disposed on the anode to a plasma including low
5 energy electrons and a species reactive with the semiconductor; and
6 an additional structure within said plasma, said additional structure capable of being
7 electrically biased

1 13. The apparatus of claim 12, wherein said additional structure is dc electrically biased.

1 14. The apparatus of claim 12, wherein said additional structure is ac electrically biased.

1 15. The apparatus of claim 12, wherein said additional structure is both ac and dc
2 electrically biased.

1 16. An apparatus for low-damage anisotropic low energy electron enhanced etching of a
2 substrate, comprising:
3 a plasma reactor;
4 a plasma creation means at least partially disposed within the plasma reactor for
5 creating a plasma having positively charged ions and electrons;
6 a substrate holder disposed within the plasma reactor for receiving a substrate,
7 wherein the substrate holder is isolated from the plasma creation means;
8 an electron etcher means for etching the substrate received by the substrate holder
9 with electrons from the plasma, wherein the electron etching means is in
10 electrical communication with the substrate holder; and
11 a charged particle controller means for controlling the flux of charged particle from a
12 plasma onto a substrate disposed on the substrate holder, the charged particle
13 controller means disposed proximal to the substrate holder.

1 17. The apparatus of claim 16, wherein the charged particle controller means is adapted
2 to control the energy of charged particles being impacted onto the substrate.

1 18. The apparatus of claim 16, further including:
2 a charged particle blocking means for preventing charged particles in the plasma
3 from reaching the substrate unless the charged particles pass through the
4 charged particle controller means.